UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/823,465	04/13/2004	Walter E. Red	1737.2.15	4603

21552 7590 12/10/2009

AUSTIN RAPP & HARDMAN
170 South Main Street, Suite 735
SALT LAKE CITY, UT 84101

EXAMINER	
NORTON, JENNIFER L	

ART UNIT	PAPER NUMBER
2121	

NOTIFICATION DATE	DELIVERY MODE
12/10/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

usptocorrespondence@austin-rapp.com

Office Action Summary	Application No.	Applicant(s)	
	10/823,465	RED ET AL.	
	Examiner	Art Unit	
	JENNIFER L. NORTON	2121	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 August 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4-12,14-23 and 25-31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4-12,14-23 and 25-31* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *17 June 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

1. The following is a **Non-Final Office Action** in response to the Appeal Brief filed on 21 August 2009. Claims 3, 13 and 24 have been previously cancelled. Claims 1, 2, 4-12, 14-23 and 25-31 are pending in this application.

Response to Arguments

2. Applicant's arguments see Remarks pgs. 8-11, filed 21 August 2009 with respect to claims 1, 2, 4-12, 14-23 and 25-31 under 35 U.S.C. 103(a) have been considered but are moot in view of the new ground(s) of rejection.

3. Claims 1, 2, 4-12, 14-23 and 25-31 stand rejected under 35 U.S.C. 103(a) as set forth below.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1, 2, 4-12, 14-23 and 25-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,499,054 (hereinafter Hesslink) in view of U.S.

Patent No.: 6,028,412 (hereinafter Shine) in further view of U.S. Patent No. 6,757,247 B1 (hereinafter Zheng).

6. As per claim 1, Hesslink teaches to a method for controlling electronic devices through a host device, the method comprising:

establishing real-time (col. 2, lines 10-12 and col. 9, lines 60-64) electronic communications over a network (col. 3, lines 37-38, 41-43 and 67, col. 4, lines 1-10 and Fig. 1A, element 62, i.e. "GPIB, RS-232, PCI, USB, Ethernet, etc." and Fig. 1A, element "the cable connection between element 62 and 60") between the host device (Fig. 1A, element 60) and one or more controlled devices (col. 3 lines 37-38 and 41-43, col. 4, lines 16-18 and Fig. 1A, element 64);

executing control software (Fig. 1, element 112) in the host device (col. 4, lines 2-10 and 53-55) to generate control input parameters for the one or more controlled devices (abstract, lines 1-4 and col. 3, lines 24-26 and 37-38); and

sending the control input parameters to the one or more controlled devices (abstract, lines 1-4, col. 3, lines 24-26 and 37-38 and col. 4, lines 18-21).

Hesslink does not expressly teach to frequency-based electronic communications, assigning each controlled device a control frequency specific to that controlled device and the control input parameters for a particular controlled device are always sent to that controlled device at the assigned control frequency for that controlled device; and ensuring that the sum of all the control frequencies for the one or more controlled

devices does not exceed the network's bandwidth, so that electronic communication with each controlled device always occurs at the assigned control frequency for that controlled device, thereby facilitating real-time communication with that controlled device; wherein the one or more controlled devices do not include a hardware controller for generating the control input parameters, but instead receive the control input parameters from the host device via the frequency-based, real-time electronic communications.

Shine teaches to frequency-based (col. 1, lines 62-65 and col. 2, lines 12-26), real-time electronic communications (col. 7, lines 8-13), assigning each controlled device a control frequency specific to that controlled device (col. 1, lines 62-65 and col. 2, lines 12-26) and the control input parameters for a particular controlled device are always sent to that controlled device at the assigned control frequency for that controlled device (col. 3, lines 18-25); electronic communication with each controlled device always occurs at the assigned control frequency for that controlled device (col. 3, lines 18-25), and facilitating real-time communication with that controlled device ((col. 7, lines 8-13; frequencies are assigned up to the maximum bandwidth to provide real-time communication and per Applicant's Disclosure (U.S. Patent Publication No. 2005/0226192, pg. 6, par. [0073]), real-time communication can only take place when the sum of all the frequencies cannot exceed the bandwidth of the system) and the control input parameters from the host device via the frequency-based (col. 3, lines 18-25).

Shine does not expressly teach ensuring that the sum of all the control frequencies for the one or more controlled devices does not exceed the network's bandwidth, thereby facilitating real-time communication with that controlled device; and wherein the one or more controlled devices do not include a hardware controller for generating the control input parameters.

Zheng teaches to ensuring that the sum of all the control frequencies for the one or more controlled devices does not exceed the network's bandwidth (col. 4, lines 42-45), thereby facilitating real-time communication with that controlled device (col. 5, lines 16-25).

Zheng does not expressly teach wherein the one or more controlled devices do not include a hardware controller for generating the control input parameters.

It would have been obvious to one of ordinary skill in the art at the time of Applicant's invention, since it has been held that the one or more controlled devices do not include a hardware controller for generating the control input parameters, since it has been held that omission of an elements and its function in a combination where the reaming elements perform the same functions as before involves only routine skill in the art. In re Karlson, 136 USPQ 184. In addition it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the teaching of Hesslink to include frequency-based, real-time electronic communications, assigning each controlled device a control frequency specific to that controlled device and the control

input parameters for a particular controlled device are always sent to that controlled device at the assigned control frequency for that controlled device; electronic communication with each controlled device always occurs at the assigned control frequency for that controlled device, and facilitating real-time communication with that controlled device to simplify the comparison between the stored trigger value and the stored accumulator value as the binary value of the stored trigger value is represented by a single bit in a register being set and exceeding the trigger value is also represented by a single bit being set (Shine: col. 2, lines 15-22); in addition to being implemented very cheaply on commercially available integrated circuits and embedded controllers (Shine: col. 3, lines 45-48); and ensuring that the sum of all the control frequencies for the one or more controlled devices does not exceed the network's bandwidth, thereby facilitating real-time communication with that controlled device to guarantee that the quality of service over the network will not degrade by allowing too many connections (Zheng: col. 5, lines 22-25).

7. As per claim 2, Hesslink teaches as set forth above receiving at the host device, output parameters from the controlled devices in response to the control input parameters (col. 3, line 67 and col. 4, lines 1-14).

8. As per claim 4, Hesslink teaches to establishing real-time electronic communications (col. 2, lines 10-12) with a plurality of controlled devices (Fig. 1A elements 64 and 70).

Hesslink does not expressly teach the control frequency is assigned using a 2^n time slicing algorithm, where N is a non-negative integer, wherein each control frequency that is assigned ha a value of 2^N, and assigning a discrete control frequency for each controlled device using the 2^N time slicing algorithm, where N is a non-negative integer.

Shine teaches the control frequency is assigned using a 2^n time slicing algorithm, where N is a non-negative integer, wherein each control frequency that is assigned ha a value of 2^N (col. 1, lines 62-65 and col. 2, lines 12-26), and assigning a discrete control frequency for each controlled device using the 2^N time slicing algorithm, where N is a non-negative integer (col. 1, lines 62-65 and col. 2, lines 12-26).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the teaching of Hesslink to include the control frequency is assigned using a 2^n time slicing algorithm, where N is a non-negative integer, wherein each control frequency that is assigned ha a value of 2^N, and assigning a discrete control frequency for each controlled device using the 2^N time slicing algorithm, where N is a non-negative integer to simplify the comparison between

the stored trigger value and the stored accumulator value as the binary value of the stored trigger value is represented by a single bit in a register being set and exceeding the trigger value is also represented by a single bit being set (Shine: col. 2, lines 15-22); in addition to being implemented very cheaply on commercially available integrated circuits and embedded controllers (Shine: col. 3, lines 45-48).

9. As per claim 5, Hesslink does not expressly teach N is independently determined for each controlled device of the plurality of the controlled devices.

Shine teaches N is independently determined for each controlled device of the plurality of the controlled devices (col. 2, lines 12-26).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the teaching of Hesslink to include N is independently determined for each controlled device of the plurality of the controlled devices to simplify the comparison between the stored trigger value and the stored accumulator value as the binary value of the stored trigger value is represented by a single bit in a register being set and exceeding the trigger value is also represented by a single bit being set (Shine: col. 2, lines 15-22) in addition to being implemented very cheaply on commercially available integrated circuits and embedded controllers (Shine: col. 3, lines 45-48).

10. As per claim 6, Hesslink does not expressly teach the 2^N time slicing algorithm comprises assigning the control frequency at 2^N hertz, where N is a non-negative integer that will yield a discrete control frequency in proximity to a preferred control frequency of each controlled device.

Shine teaches to the 2^N time slicing algorithm comprises assigning the control frequency at 2^N hertz, where N is a non-negative integer that will yield a discrete control frequency in proximity to a preferred control frequency of each controlled device (col. 1, lines 62-65 and col. 2, lines 12-26).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the teaching of Hesslink to the 2^N time slicing algorithm comprises assigning the control frequency at 2^N hertz, where N is a non-negative integer that will yield a discrete control frequency in proximity to a preferred control frequency of each controlled device to simplify the comparison between the stored trigger value and the stored accumulator value as the binary value of the stored trigger value is represented by a single bit in a register being set and exceeding the trigger value is also represented by a single bit being set (Shine: col. 2, lines 15-22); in addition to being implemented very cheaply on commercially available integrated circuits and embedded controllers (Shine: col. 3, lines 45-48).

11. As per claim 7, Hesslink teaches as set forth above initiating a control loop process on the host device when electronic communication is established with a controlled devices (col. 3, line 67, col. 4, lines 1-14 and Fig. 1B, elements 100, 110, 112 and 120).

12. As per claim 8, Hesslink teaches as set forth above accessing the host device from a remote computing device (Fig. 1B, element 118) via the Internet (col. 3, lines 6-8 and Fig. 1B, element 50).

13. As per claim 9, Hesslink teaches as set forth above providing information relating to the controlled devices to a user at the remote computing device (col. 4, lines 11-14 and Fig. 1B, element 118).

14. As per claim 10, Hesslink teaches as set forth above receiving user input at the host device from the user at the remote computing device, wherein the input relates to the controlled device (col. 4, lines 16-18 and Fig. 1B, element 114).

15. As per claim 11, Hesslink teaches to a computing device configured for controlling electronic devices, the computing device comprising:

a processor (col. 3, lines 8-12);

memory in electronic communication with the processor (col. 3, lines 8-11); and

executable instructions executable by the processor (col. 3, lines 25-27), wherein the executable instructions are **configured (as opposed to actually configuring)** for:

establishing real-time (col. 2, lines 10-12 and col. 9, lines 60-64) electronic communications over a network (col. 3, lines 37-38, 41-43 and 67, col. 4, lines 1-10 and Fig. 1A, element 62, i.e. "GPIB, RS-232, PCI, USB, Ethernet, etc." and Fig. 1A, element "the cable connection between element 62 and 60") between the host device (Fig. 1A, element 60) and one or more controlled devices (col. 3, lines 37-38 and 41-43, col. 4, lines 16-18 and Fig. 1A, element 64);

executing control software in the host device to generate control input parameters for the one or more controlled devices (abstract, lines 1-4 and col. 3, lines 24-26 and 37-38);

sending the control input parameters to the one or more controlled devices (abstract, lines 1-4 and col. 3, lines 24-26 and 37-38).

Hesslink does not expressly teach to frequency-based electronic communications, assigning each controlled device a control frequency specific to that controlled device and the control input parameters for a particular controlled device are always sent to that controlled device at the assigned control frequency for that controlled device; and ensuring that the sum of all the control frequencies for the one or more controlled devices does not exceed the network's bandwidth, so that electronic communication

with each controlled device always occurs at the assigned control frequency for that controlled device, thereby facilitating real-time communication with that controlled device; wherein the one or more controlled devices do not include a hardware controller for generating the control input parameters, but instead receive the control input parameters from the host device via the frequency-based, real-time electronic communications.

Shine teaches to frequency-based (col. 1, lines 62-65 and col. 2, lines 12-26), real-time electronic communications (col. 7, lines 8-13), assigning each controlled device a control frequency specific to that controlled device (col. 1, lines 62-65 and col. 2, lines 12-26) and the control input parameters for a particular controlled device are always sent to that controlled device at the assigned control frequency for that controlled device (col. 3, lines 18-25); electronic communication with each controlled device always occurs at the assigned control frequency for that controlled device (col. 3, lines 18-25), and facilitating real-time communication with that controlled device ((col. 7, lines 8-13; frequencies are assigned up to the maximum bandwidth to provide real-time communication and per Applicant's Disclosure (U.S. Patent Publication No. 2005/0226192, pg. 6, par. [0073]), real-time communication can only take place when the sum of all the frequencies cannot exceed the bandwidth of the system) and the control input parameters from the host device via the frequency-based (col. 3, lines 18-25).

Shine does not expressly teach ensuring that the sum of all the control frequencies for the one or more controlled devices does not exceed the network's bandwidth, thereby facilitating real-time communication with that controlled device; and wherein the one or more controlled devices do not include a hardware controller for generating the control input parameters.

Zheng teaches to ensuring that the sum of all the control frequencies for the one or more controlled devices does not exceed the network's bandwidth (col. 4, lines 42-45), thereby facilitating real-time communication with that controlled device (col. 5, lines 16-25).

Zheng does not expressly teach wherein the one or more controlled devices do not include a hardware controller for generating the control input parameters.

It would have been obvious to one of ordinary skill in the art at the time of Applicant's invention, since it has been held that the one or more controlled devices do not include a hardware controller for generating the control input parameters, since it has been held that omission of an elements and its function in a combination where the reaming elements perform the same functions as before involves only routine skill in the art. In re Karlson, 136 USPQ 184. In addition it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the teaching of Hesslink to include frequency-based, real-time electronic communications, assigning each controlled device a control frequency specific to that controlled device and the control

input parameters for a particular controlled device are always sent to that controlled device at the assigned control frequency for that controlled device; electronic communication with each controlled device always occurs at the assigned control frequency for that controlled device, and facilitating real-time communication with that controlled device to simplify the comparison between the stored trigger value and the stored accumulator value as the binary value of the stored trigger value is represented by a single bit in a register being set and exceeding the trigger value is also represented by a single bit being set (Shine: col. 2, lines 15-22); in addition to being implemented very cheaply on commercially available integrated circuits and embedded controllers (Shine: col. 3, lines 45-48); and ensuring that the sum of all the control frequencies for the one or more controlled devices does not exceed the network's bandwidth, thereby facilitating real-time communication with that controlled device to guarantee that the quality of service over the network will not degrade by allowing too many connections (Zheng: col. 5, lines 22-25).

16. As per claim 12, Hesslink teaches as set forth above the executable instructions are also **configured for receiving (as opposed to actually receiving)**, at the computing device, output parameters from the controlled device in response to the control input parameters (col. 3, line 67 and col. 4, lines 1-14).

17. As per claim 14, Hesslink teaches as set forth above executable instructions are also **configured for establishing (as opposed to actually establishing)** real-time (col. 2, lines 10-12) electronic communications with a plurality of controlled devices (Fig. 1A, elements 64 and 70).

Hesslink does not expressly teach the control frequency is assigned using a 2^N time slicing algorithm, where N is a non-negative integer, wherein each control frequency that is assigned has a value of 2^N, and assigning a discrete control frequency for each controlled device using the 2^N time slicing algorithm, where N is a non-negative integer.

Shine teaches to the control frequency is assigned using a 2^N time slicing algorithm, where N is a non-negative integer, wherein each control frequency that is assigned has a value of 2^N (col. 1, lines 62-65 and col. 2, lines 12-26), and assigning a discrete control frequency for a controlled device using the 2^N time slicing algorithm, where N is a non-negative integer (col. 1, lines 62-65 and col. 2, lines 12-26).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the teaching of Hesslink to include the control frequency is assigned using a 2^N time slicing algorithm, where N is a non-negative integer, wherein each control frequency that is assigned has a value of 2^N, and assigning a discrete control frequency for each controlled device using the 2^N time

slicing algorithm, where N is a non-negative integer to simplify the comparison between the stored trigger value and the stored accumulator value as the binary value of the stored trigger value is represented by a single bit in a register being set and exceeding the trigger value is also represented by a single bit being set (Shine: col. 2, lines 15-22); in addition to being implemented very cheaply on commercially available integrated circuits and embedded controllers (Shine: col. 3, lines 45-48).

18. As per claim 15, Hesslink does not expressly teach N is independently determined for each controlled device of the plurality of controlled devices.

Shine teaches N is independently determined for each controlled device of the plurality of controlled devices (col. 2, lines 12-26).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the teaching of Hesslink to include N is independently determined for each controlled device of the plurality of the controlled devices to simplify the comparison between the stored trigger value and the stored accumulator value as the binary value of the stored trigger value is represented by a single bit in a register being set and exceeding the trigger value is also represented by a single bit being set (Shine: col. 2, lines 15-22); in addition to being implemented very cheaply on commercially available integrated circuits and embedded controllers (Shine: col. 3, lines 45-48).

19. As per claim 16, Hesslink does not expressly teach the 2^N time slicing algorithm comprises assigning the control frequency at 2^N hertz, where N is a non-negative integer that will yield a discrete control frequency in proximity to a preferred control frequency of the controlled device.

Shine teaches to the 2^N time slicing algorithm comprises assigning the control frequency at 2^N hertz, where N is a non-negative integer that will yield a discrete control frequency in proximity to a preferred control frequency of the controlled device (col. 1, lines 62-65 and col. 2, lines 12-26).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the teaching of Hesslink to the 2^N time slicing algorithm comprises assigning the control frequency at 2^N hertz, where N is a non-negative integer that will yield a discrete control frequency in proximity to a preferred control frequency of the controlled device to simplify the comparison between the stored trigger value and the stored accumulator value as the binary value of the stored trigger value is represented by a single bit in a register being set and exceeding the trigger value is also represented by a single bit being set (Shine: col. 2, lines 15-22); in addition to being implemented very cheaply on commercially available integrated circuits and embedded controllers (Shine: col. 3, lines 45-48).

20. As per claim 17, Hesslink teaches as set forth above the executable instructions are also **configured for initiating (as opposed to actually initiating)** a control loop process on the computing device when electronic communication is established with a controlled device (col. 3, line 67, col. 4, lines 1-14, Fig. 1B and elements 100, 110, 112 and 120).

21. As per claim 18, Hesslink does not expressly teach the executable instructions are also **configured for initiating (as opposed to actually initiating)** a torque/current control loop process at a microcontroller on the controlled device when the controlled device comprises a motor.

Shine teaches to initiating a torque/current control loop process at a microcontroller on the controlled device when the controlled device comprises a motor (col. 3, lines 18-25).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the teaching of Hesslink to include initiating a torque/current control loop process at a microcontroller on the controlled device when the controlled device comprises a motor because the method is well suited to governing motor speeds and in particular for controlling stepper motors, including full step, half step and micro-steppers. Similarly, the speed of a DC motor can be regulated with this method by providing the controlling frequency that governs the rotational speed of the

armature (Shine: col. 3, lines 35-41). In addition the method can be implemented very cheaply on commercially available integrated circuits and embedded controllers (Shine: col. 3, lines 45-48).

22. As per claim 19, Hesslink teaches as set forth above the executable instructions are also **configured for accessing (as opposed to actually accessing)** the computing device from a remote computing device (Fig.1B, element 118) via the Internet (col. 3, lines 6-8 and Fig. 1B, element 50).

23. As per claim 20, Hesslink teaches as set forth above the executable instructions are also **configured for providing (as opposed to actually providing)** information relating to the controlled devices to a user at the remote computing device (col. 4, lines 11-14 and Fig. 1B, element 118).

24. As per claim 21, Hesslink teaches as set forth above the executable instructions are also **configured for receiving (as opposed to actually receiving)** user input at the computing device from the user at the remote computing device, wherein the input relates to the controlled devices (col. 4, lines 16-18 and Fig. 1B, element 114).

25. As per claim 22, Hesslink teaches to a computer-readable medium for storing program data, wherein the program data comprises executable instructions for:

establishing real-time (col. 2, lines 10-12 and col. 9, lines 60-64) electronic communications over an network (col. 3, lines 37-38, 41-43 and 67, col. 4, lines 1-10 and Fig. 1A, element 62, i.e. "GPIB, RS-232, PCI, USB, Ethernet, etc." and Fig. 1A, element "the cable connection between element 62 and 60") between the computing device (Fig. 1A, element 60) and one or more controlled devices (col. 3, lines 37-38 and 41-43, col. 4, lines 16-18 and Fig. 1A, element 64);

executing control software in the host device to generate control input parameters for the one or more controlled device (abstract, lines 1-4 and col. 3, lines 24-26 and 37-38); and

sending the control input parameters to the one or more controlled device (abstract, lines 1-4 and col. 3, lines 24-26 and 37-38).

Hesslink does not expressly teach to frequency-based electronic communications, assigning each controlled device a control frequency specific to that controlled device and the control input parameters for a particular controlled device are always sent to that controlled device at the assigned control frequency for that controlled device; and ensuring that the sum of all the control frequencies for the one or more controlled devices does not exceed the network's bandwidth, so that electronic communication with each controlled device always occurs at the assigned control frequency for that controlled device, thereby facilitating real-time communication with that controlled device; wherein the one or more controlled devices do not include a hardware controller for generating the control input parameters, but instead receive the control input

parameters from the host device via the frequency-based, real-time electronic communications.

Shine teaches to frequency-based (col. 1, lines 62-65 and col. 2, lines 12-26), real-time electronic communications (col. 7, lines 8-13), assigning each controlled device a control frequency specific to that controlled device (col. 1, lines 62-65 and col. 2, lines 12-26) and the control input parameters for a particular controlled device are always sent to that controlled device at the assigned control frequency for that controlled device (col. 3, lines 18-25); electronic communication with each controlled device always occurs at the assigned control frequency for that controlled device (col. 3, lines 18-25), and facilitating real-time communication with that controlled device ((col. 7, lines 8-13; frequencies are assigned up to the maximum bandwidth to provide real-time communication and per Applicant's Disclosure (U.S. Patent Publication No. 2005/0226192, pg. 6, par. [0073]), real-time communication can only take place when the sum of all the frequencies cannot exceed the bandwidth of the system) and the control input parameters from the host device via the frequency-based (col. 3, lines 18-25).

Shine does not expressly teach ensuring that the sum of all the control frequencies for the one or more controlled devices does not exceed the network's bandwidth, thereby facilitating real-time communication with that controlled device; and

wherein the one or more controlled devices do not include a hardware controller for generating the control input parameters.

Zheng teaches to ensuring that the sum of all the control frequencies for the one or more controlled devices does not exceed the network's bandwidth (col. 4, lines 42-45), thereby facilitating real-time communication with that controlled device (col. 5, lines 16-25).

Zheng does not expressly teach wherein the one or more controlled devices do not include a hardware controller for generating the control input parameters.

It would have been obvious to one of ordinary skill in the art at the time of Applicant's invention, since it has been held that the one or more controlled devices do not include a hardware controller for generating the control input parameters, since it has been held that omission of an elements and its function in a combination where the reaming elements perform the same functions as before involves only routine skill in the art. In re Karlson, 136 USPQ 184. In addition it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the teaching of Hesslink to include frequency-based, real-time electronic communications, assigning each controlled device a control frequency specific to that controlled device and the control input parameters for a particular controlled device are always sent to that controlled device at the assigned control frequency for that controlled device; electronic communication with each controlled device always occurs at the assigned control

frequency for that controlled device, and facilitating real-time communication with that controlled device to simplify the comparison between the stored trigger value and the stored accumulator value as the binary value of the stored trigger value is represented by a single bit in a register being set and exceeding the trigger value is also represented by a single bit being set (Shine: col. 2, lines 15-22); in addition to being implemented very cheaply on commercially available integrated circuits and embedded controllers (Shine: col. 3, lines 45-48); and ensuring that the sum of all the control frequencies for the one or more controlled devices does not exceed the network's bandwidth, thereby facilitating real-time communication with that controlled device to guarantee that the quality of service over the network will not degrade by allowing too many connections (Zheng: col. 5, lines 22-25).

26. As per claim 23, Hesslink teaches as set forth above the executable instructions are also **configured for receiving (as opposed to actually receiving)**, at the computing device, output parameters from the controlled device in response to the control input parameters (col. 3, line 67 and col. 4, lines 1-14).

27. As per claim 25, Hesslink teaches as set forth above to the executable instructions are also **configured for establishing (as opposed to actually establishing)** real-time (col. 2, lines 10-12) electronic communications with a plurality of controlled devices (Fig. 1A, elements 64 and 70).

Hesslink does not expressly teach to the control frequency is assigned using a 2^N time slicing algorithm, where N is a non-negative integer, wherein each control frequency that is assigned has a vale of 2^N, and assigning a discrete control frequency for each controlled device using the 2^N time slicing algorithm, where N is a non-negative integer.

Shine teaches to the control frequency is assigned using a 2^N time slicing algorithm, where N is a non-negative integer, wherein each control frequency that is assigned has a vale of 2^N (col. 1, lines 62-65 and col. 2, lines 12-26), and assigning a discrete control frequency for a controlled device using the 2^N time slicing algorithm, where N is a non-negative integer (col. 1, lines 62-65 and col. 2, lines 12-26).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the teaching of Hesslink to include the control frequency is assigned using a 2^N time slicing algorithm, where N is a non-negative integer, wherein each control frequency that is assigned has a vale of 2^N, and assigning a discrete control frequency for each controlled device using the 2^N time slicing algorithm, where N is a non-negative integer to simplify the comparison between the stored trigger value and the stored accumulator value as the binary value of the stored trigger value is represented by a single bit in a register being set and exceeding the trigger value is also represented by a single bit being set (Shine: col. 2, lines 15-

22); in addition to being implemented very cheaply on commercially available integrated circuits and embedded controllers (Shine: col. 3, lines 45-48).

28. As per claim 26, Hesslink does not expressly teach N is independently determined for each controlled device of the plurality of controlled devices.

Shine teaches N is independently determined for each controlled device of the plurality of the controlled devices (col. 2, lines 12-26).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the teaching of Hesslink to include N is independently determined for each controlled device of the plurality of the controlled devices to simplify the comparison between the stored trigger value and the stored accumulator value as the binary value of the stored trigger value is represented by a single bit in a register being set and exceeding the trigger value is also represented by a single bit being set (Shine: col. 2, lines 15-22); in addition to being implemented very cheaply on commercially available integrated circuits and embedded controllers (Shine: col. 3, lines 45-48).

29. As per claim 27, Hesslink does not expressly teach the 2^N time slicing algorithm comprises assigning the control frequency at 2^N hertz, where N is a non-negative

integer that will yield a discrete control frequency in proximity to a preferred control frequency of the controlled device.

Shine teaches to the 2^N time slicing algorithm comprises assigning the control frequency at 2^N hertz, where N is a non-negative integer that will yield a discrete control frequency in proximity to a preferred control frequency of the controlled device (col. 1, lines 62-65 and col. 2, lines 12-26).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the teaching of Hesslink to the 2^N time slicing algorithm comprises assigning the control frequency at 2^N hertz, where N is a non-negative integer that will yield a discrete control frequency in proximity to a preferred control frequency of the controlled device to simplify the comparison between the stored trigger value and the stored accumulator value as the binary value of the stored trigger value is represented by a single bit in a register being set and exceeding the trigger value is also represented by a single bit being set (Shine: col. 2, lines 15-22); in addition to being implemented very cheaply on commercially available integrated circuits and embedded controllers (Shine: col. 3, lines 45-48).

30. As per claim 28, Hesslink teaches as set forth above the executable instructions are also **configured for initiating (as opposed to actually initiating)** a control loop process on the computing device when electronic communication is established

with a controlled device (col. 3, line 67, col. 4, lines 1-14 and Fig. 1B, elements 100, 110, 112 and 120).

31. As per claim 29, Hesslink teaches as set forth above the executable instructions are also **configured for accessing (as opposed to actually accessing)** the computing device from a remote computing device (Fig. 1B, element 118) via the Internet (col. 3, lines 6-8 and Fig. 1B, element 50).

32. As per claim 30, Hesslink teaches as set forth above the executable instructions are also **configured for providing (as opposed to actually providing)** information relating to the controlled devices to a user at the remote computing device (col. 4, lines 11-14 and Fig. 1B, element 118).

33. As per claim 31, Hesslink teaches as set forth above the executable instructions are also **configured for receiving (as opposed to actually receiving)** user input at the computing device from the user at the remote computing device, wherein the input relates to the controlled devices (col. 4, lines 16-18 and Fig. 1B, element 114).

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following references are cited to further show the state of the art with respect to the field of communication.

U.S. Patent No. 5,850,398 discloses a transmit scheduler maps connections to scheduled time slots in an ATM network in such a manner that minimizes burstiness in an output cell stream.

U.S. Patent No. 7,499,453 B2 discloses a method for providing network access to a shared access communications medium for a plurality of users.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JENNIFER L. NORTON whose telephone number is (571)272-3694. The examiner can normally be reached on Monday-Friday between 9:00 a.m. - 5:30 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Albert Decady can be reached on 571-272-3819. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you

have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Albert DeCady
Supervisory Patent Examiner
Art Unit 2121

/JLN/

/Ramesh B. Patel/
for Albert Decady, SPE of Art Unit 2121